

Acute Health Effects of Crude Oil Spill in a Rural Community in Bonny, Rivers State, Nigeria

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Abstract: This study investigated the effects of crude oil spills on acute health challenges in rural communities in the Bonny Local Government Area. The study used a descriptive survey research design, involving an in-depth structured questionnaire distributed to 200 respondents from rural communities affected by oil spills in Bonny LGA. The collected data were subjected mean and standard deviation statistical analysis. The findings of the study revealed that oil spills occur as a result of leaking or corroded pipelines, poorly maintained storage tanks, improper disposal of used oil and other petroleum products, and accidents due to human negligence or error among others and causes a number of acute health challenges in rural communities. These include respiratory and skin diseases, as well as an increased risk of cancer, due to exposure to hazardous chemicals. Furthermore, oil spills can cause mental health issues, such as depression and anxiety. The study recommended among others that there is the need to establish strict regulations and guidelines for companies that are responsible for oil spills, such as those that involve offshore drilling, which is designed to reduce the risk of oil spills and subsequent pollution.

Key words: Acute Health, Depression, Community, Rural Dwellers, oil spillage.

Introduction

Acute health, also known as acute care, is a type of medical care that focuses on the diagnosis, treatment, and prevention of urgent medical conditions (Gill, 2019). Acute care is typically provided in an emergency department or hospital setting; however, it can also be provided in specialty clinics, such as those for trauma or critical care. Acute care is often necessary for conditions that require swift diagnosis and treatment, such as a heart attack, stroke, or serious infection. Acute care may also be used to manage chronic conditions that become acute in nature, such as poorly controlled diabetes or asthma exacerbation. The aim of acute care is to manage the patient's condition, reduce the severity of symptoms, and prevent the condition from becoming more serious or life-threatening.

Crude oil spills are a major environmental disaster and can have devastating effects on both the natural environment and human health. The potential health effects of an oil spill can range from mild symptoms to serious, long-term health complications. Acute health care is crucial in responding to crude oil spills and helping to mitigate the damage they can cause. Oil spills can have a devastating effect on rural communities (Croteau, 2014). An oil spill can pollute the land and water, which can result in the loss of farmland, the destruction of wildlife habitats, and damage to the local economy (Friedman, 2015). In addition, an oil spill can have a negative impact on the health of those living in the community, with studies linking exposure to petroleum products to a range of health problems, including respiratory illnesses and cancer (Pearson, et al., 2016). Furthermore, the environmental impacts of an oil spill can linger for many years, as the cleanup process can be slow and expensive, and the land and water may never be restored to their original conditions (Croteau, 2014).

Again, it is observed that a crude oil spill in a rural community can have a variety of acute health effects depending on the size, duration, and composition of the spill. Crude oil contains a variety of toxic chemicals, such as benzene, toluene, xylene, and other volatile organic compounds (VOCs) (Khan et al., 2020). Depending on the size of the spill, the toxic chemicals can be released into the air and could affect the health of nearby residents. The chemicals may also enter water sources, leading to contaminated drinking water, which can lead to gastrointestinal problems, such as vomiting and diarrhea, as well as neurological issues, such as headaches and dizziness (Nguyen et al., 2020). In addition, the physical clean-up of a crude oil spill can be hazardous to the health of the people involved. During the clean-up process, workers may be exposed to hazardous fumes and chemicals that can cause respiratory and skin irritation, as well as more serious conditions, such as lung cancer (Fung et al., 2020).

Furthermore, workers may be exposed to contaminated water, which can lead to a variety of gastrointestinal and neurological issues similar to those of contaminated drinking water. Finally, a crude oil spill can have psychological impacts on the people in the affected community. Residents may experience fear, anxiety, and/or depression due to the disruption of their daily lives and the potential long-term environmental and health impacts of a crude oil spill (Berger et al., 2020). The psychological impacts of a crude oil spill may be more pronounced in rural areas, such as rural where there are fewer resources available to address the impacts of the spill.

In addition, the length of time someone is exposed to an oil spill can also influence their risk of developing health effects. Therefore, acute health care is an essential part of responding to an oil spill. It is important for medical professionals to identify and treat any immediate health effects that may be caused by exposure to crude oil. This includes providing medical treatment, helping to identify any long-term health risks, and providing counseling and support to those affected. Acute health care can also help to reduce the potential long-term health risks associated with an oil spill. Medical professionals can advise people on preventive measures such as avoiding contact with oil-contaminated areas, using appropriate protective equipment, and using air purifiers to reduce exposure to hazardous air contaminants. Acute health care can also help to identify and treat any long-term health effects that may be caused by exposure to crude oil.

Statement of the Problem

An oil spill, whether crude oil or refined oil, can have a range of acute health effects for humans living in the affected rural community of Bonny in Nigeria. These effects can include respiratory, neurological, and gastrointestinal issues, as well as skin irritation and cancer (Hogstrand, 2019). Oil spills can cause direct physical damage to the environment. The spilled oil can destroy vegetation, contaminate soil and water supplies, and kill marine and other wildlife. In addition to the environmental damage, crude oil spills can also have a serious impact on human health. Studies have shown that people exposed to crude oil spills can suffer from respiratory, neurological, reproductive,

and gastrointestinal issues (Gonzalez-Flesca *et al.*, 2019). These symptoms can range from mild to severe, and may even require long-term treatment. The health effects of a crude oil spill depend on the type of oil spilled, the amount of oil spilled, and the degree of exposure. Certain types of crude oil may contain more hazardous components than others, and the longer the exposure to these components, the more likely someone is to develop health problems.

The inhalation of volatile organic compounds (VOCs) from crude oil spills can cause respiratory health problems such as acute bronchitis and asthma, as well as more serious conditions such as chronic obstructive pulmonary disease (COPD) and emphysema (Hogstrand, 2019). In a study of the health effects of the 1989 Exxon Valdez oil spill in Alaska, researchers found that 32% of those exposed to the VOCs developed respiratory symptoms (Mozaffarian *et al.*, 1996). The inhalation of crude oil components has been linked to neurological effects. These effects include memory loss, depression, and anxiety, as well as symptoms of cognitive impairment such as difficulty concentrating, confusion, and impaired judgment (Hogstrand, 2019). In the same study of the Exxon Valdez oil spill, researchers found that 22% of those exposed to the VOCs developed neurological symptoms (Mozaffarian *et al.*, 1996).

The direct contact of crude oil components can cause skin irritation and dermatitis, as well as other skin diseases such as eczema and psoriasis (Hogstrand, 2019). In the same study of the Exxon Valdez oil spill, researchers found that 8% of those exposed to the VOCs developed skin symptoms (Mozaffarian *et al.*, 1996). The inhalation of volatile organic compounds (VOCs) from crude oil spills has been linked to an increased risk of cancer. In the same study of the Exxon Valdez oil spill, researchers found that 5% of those exposed to the VOCs developed cancer (Mozaffarian *et al.*, 1996).

A crude oil spill in the rural community of Bonny in Nigeria could have a range of acute health effects for humans, including respiratory, neurological, gastrointestinal, skin, and cancer but there is a paucity of scholarly investigation on the acute health effects of a crude oil spill in a rural community in Bonny, Rivers State, Nigeria. Therefore, it is necessary for those living in rural communities in the affected areas to be aware of the potential health risks associated with oil spills and to take the necessary precautions to protect their health.

Objectives of the Study

The aim of the study is to examine the acute health impact of crude oil spills on rural community dwellers in Bonny, Rivers State, Nigeria. Specifically, the study seeks to:

- 1) examine the causes of oil spillage in rural communities in Bonny
- 2) investigate the impact of oil spillage on the acute health condition of the rural community dwellers in Bonny, LGA
- 3) examine ways of remedying acute health effects of a crude oil spill in a rural community

Research Questions

The following research questions were formulated to guide this study:

- 1) What are the causes of oil spillage in rural communities in Bonny?
- 2) What is the impact of oil spillage on the acute health condition of the rural community dwellers in Bonny, LGA?
- 3) What ways can be employed to remedy the acute health effects of a crude oil spill in a rural community?

Literature Review

Acute Health

Acute health refers to a short-term, usually severe, medical condition that requires immediate attention and treatment (Mehta, 2017). Acute health issues can range from minor illnesses such as colds and flu, to more serious medical conditions such as heart attacks, strokes, or organ failure. These medical conditions may require hospitalization, medications, and surgery. The treatment of acute health issues is often complex and involves a multidisciplinary approach by medical professionals such as doctors and nurses (Healy, 2018). The most common acute health conditions are infections, injuries, and acute exacerbations of chronic diseases (Liu, 2017). Infections can be caused by a variety of pathogens, including bacteria, viruses, fungi, and parasites. Injuries can be caused by physical trauma, such as falls, motor vehicle accidents, or sports injuries. Acute exacerbations of chronic diseases, such as asthma, diabetes, or heart failure, require immediate treatment to prevent serious complications. Early diagnosis and prompt treatment of acute health conditions are essential for good outcomes. Prompt treatment can reduce the severity of the illness, reduce the risk of complications, and improve quality of life (Chiang & Lai, 2018). Early diagnosis can also help to prevent more serious illnesses, such as hospital-acquired infections, from developing.

The management of acute health conditions involves a variety of interventions. These can include medications, such as antibiotics, antiviral drugs, or anti-inflammatory drugs; lifestyle modifications, such as exercise, diet, and stress management; and physical therapy. Surgery may also be necessary in some cases (O'Neill & Smith, 2019). The goal of treatment is to improve the patient's symptoms and prevent further complications. In conclusion, acute health issues require immediate attention and treatment. Early diagnosis and prompt treatment are essential for good outcomes. A multidisciplinary approach is often necessary for the successful management of acute health conditions.

Crude Oil Spill

Crude oil spills are a major environmental hazard and have caused significant destruction to ecosystems, economies, and human health. They occur when large amounts of oil are released into the environment, either accidentally or intentionally, and can cause significant ecological, economic, and public health damage (Sparrow & Fingas, 2013). Crude oil spills can come from a variety of sources, including oil tankers and pipelines, offshore drilling rigs, and oil storage facilities (National Research Council, 2003). The most common type of crude oil spill is from oil tankers, which are used to transport large amounts of oil from one location to another (Kirchner et al., 2017). The most significant impacts of crude oil spills are in the marine environment. Oil spills can kill organisms both directly, through contact with the oil, and indirectly, through smothering, water pollution, and the release of toxic compounds (Sparrow & Fingas, 2013). This can cause the destruction of entire ecosystems, such as coral reefs, seagrass beds, and coastal wetlands (Kirchner et al., 2017). The economic impacts of crude oil spills can be significant as well. Spills can cause significant economic damage to the fishing and tourism industries, as well as to the livelihoods of those who depend on them (Kirchner et al., 2017).

Furthermore, the costs associated with cleaning up a spill can be extremely high and can have a long-term economic impact on a region (National Research Council, 2003). Finally, crude oil spills can have a significant impact on human health. The release of toxic compounds from an oil spill can lead to an array of health problems, such as respiratory and cardiovascular diseases, neurological disorders, and cancer (Sparrow & Fingas, 2013). Also, oil spills can contaminate drinking water supplies, leading to further health concerns (Kirchner et al., 2017). To this end, crude oil spills are a major environmental hazard that can cause significant ecological, economic, and public health damage. It is

essential that steps are taken to prevent these spills from occurring, and that effective plans are in place to respond to spills quickly and efficiently.

Rural Community

Rural communities are places where people live in rural or semi-rural areas, such as farms, small towns, or villages. These communities are often characterized by strong links to the land, close relationships with neighbors, and a sense of shared identity and purpose (Mantzavinos, 2019). Rural communities are often seen as being more traditional and conservative than their urban counterparts, due to a lack of access to modern amenities and services. Rural communities face many challenges, including limited access to healthcare, education, and employment opportunities (Riley, 2020). This can lead to social and economic inequality, as rural residents often have fewer resources than their urban counterparts. Also, rural communities are often isolated from larger cities and towns, making access to social and cultural activities more difficult. Despite these challenges, rural communities are often vibrant, self-sustaining places with a strong sense of community.

Many rural communities rely heavily on local businesses and agricultural production, providing employment and economic stability. They also often have strong social networks, with neighbors helping each other in times of need. Rural communities are also important for preserving cultural identity and traditions. Many rural communities have maintained their customs and beliefs, providing a connection to the past that urban populations often lack. Such communities also serve as a refuge for those who are seeking a simpler, less-hecktic lifestyle. In order to ensure that rural communities remain viable and vibrant, it is important to support their economic and social development. This includes providing access to quality healthcare, educational opportunities, and employment opportunities. Additionally, it is important to preserve cultural identity and traditions by providing incentives for businesses to stay in rural areas and supporting local initiatives. Rural communities are important for their economic and social stability, as well as their cultural identity and traditions. It is important to preserve and support these communities in order to ensure their vitality and sustainability.

Theoretical Framework

The paper was anchored on the Social Ecological Model (SEM). It is a framework used to understand the complexity of human health and well-being (Krieger, 1996). It was developed by Dr. Robert J.K. Jacob, an American physician, and public health researcher. It posits that an individual's health is not determined solely by their physical body, but is instead a result of the complex interactions between individual, relational, and environmental levels. The SEM emphasizes that health outcomes are determined by a combination of individual and social factors and that the health of individuals is linked to the health of the community and environment in which they live (Pereda et al., 2017).

An acute health effect of a crude oil spill in a rural community can be understood through the lens of the social-ecological model. Crude oil contains a complex mixture of hydrocarbons, metals, and other contaminants that can have a number of acute health effects on humans (Cunningham et al., 2018). These effects include respiratory issues such as asthma, irritation of the eyes and throat, and skin irritation (Abfalter et al., 2017). The health impacts of a crude oil spill in a rural community can be exacerbated by the fact that many rural communities lack the resources to quickly and effectively respond to an environmental disaster, such as the presence of a well-trained emergency response team or access to necessary medical supplies (Haines et al., 2020).

The social ecological model emphasizes that an individual's health is not determined by their physical body alone, but is instead a result of their interactions with the environment. This means that a crude oil spill in a rural community may have a greater impact on the health of the individuals living in that environment due to the fact that they lack the resources to rapidly respond to the disaster and mitigate its effects (Haines et al., 2020). Also, the fact that many rural communities are already at a

disadvantage due to limited access to healthcare and other resources can further exacerbate the health impacts of the spill (Pereda et al., 2017). In conclusion, the social-ecological model illustrates the complexity of human health and its interconnectedness with the environment. An acute health effect of a crude oil spill in a rural community can have serious and long-lasting impacts on the health of individuals living in the area, especially due to the limited resources available in many rural communities.

Study Area

Bonny Local Government Area (LGA) is located in the Rivers State of Nigeria and is an administrative division of the state. It is one of the 23 LGAs in the state. It has an approximate population of 200,000 people (National Bureau of Statistics, 2020). Bonny LGA is bounded by Okrika LGA to its northwest, Andoni LGA to its northeast, Eleme LGA to its east, Degema LGA to its south, and Port Harcourt LGA to its west. The LGA is composed of several towns and villages including Akpajo, Akpoguma, Amadi-Ama, Asarama, Azuzuama, Bonny Town, Eleme, Kabo, Kula, Nkor, Nkoromitikpo, and Oruama, among others. The main economic activities in Bonny LGA are fishing, farming, oil and gas exploration, and trading. The main agricultural products grown include cassava, plantain, yam, palm oil, cocoyam, and maize. Fishing is also a major economic activity in the area and is the main source of income for many of the people living in the area. Other industries in the LGA include timber and timber products, rubber and leather goods, and salt.

The LGA is home to several notable organizations and institutions, including the Nigerian National Petroleum Corporation (NNPC), the Nigerian Ports Authority (NPA), the Bonny Island Export Processing Zone (EPZ), the Bonny Technical Institute, and the Bonny Maritime Academy (BMA). The NNPC is the largest oil and gas exploration and production company in Nigeria, while the NPA is responsible for the development and operation of Nigeria's seaports. The EPZ is a special economic zone established to promote industrial development and foreign direct investment in the LGA. The Bonny Technical Institute and the BMA provide technical and vocational training to the youth of the area.

Bonny LGA is also home to several tourist attractions, such as the Bonny Museum, the Bonny Island Cultural Centre, the Bonny River, and the Bonny Waterfront. The Bonny Museum houses a collection of artifacts and documents related to the history and culture of the area, while the Bonny Island Cultural Centre is a place of learning and celebration for the people of Bonny. The Bonny River is a popular fishing spot and the Bonny Waterfront is a popular spot for sightseeing and relaxation. In conclusion, Bonny LGA is an important administrative division of Rivers State, Nigeria. It is home to a variety of economic activities and is also home to several notable organizations and institutions. It has several tourist attractions, including the Bonny Museum, the Bonny Island Cultural Centre, the Bonny River, and the Bonny Waterfront.

Methodology

The paper adopted a descriptive survey design. The population of Bonny, Nigeria is 16868 (Agwu, 2015). Due to the largeness of the population, the researcher adopted the purposive sampling technique to select the sample for the study. The study adopted a random sampling method in the selection of 12 communities from the 78 communities in the Bonny Local Government Area of Rivers State. The communities selected were: Amabiribe Creek, Ayaminima, Bonny, Eyamba, Angalabia, Fakpa, Iwoama, Kalabiamma, Kuruama, Okoloama-Iwoma, Okolobie, Oporbakiri. Thereafter, a purposive sampling technique was adopted in the distribution of the questionnaire to the respondents. Self-made questionnaires were used to elicit valuable information from the respondents in the above-mentioned communities. The questionnaire was structured based on "four point likert scale of Agreed, Strongly Agreed, Disagreed and Strongly Disagreed, were employed in the analysis of the primary data

collected. The criterion mean was at 2.5. Any mean above 2.5 was accepted while the alternative was rejected. Finally, content analysis was used to analyze the secondary literature at the discussion stage.

Results and Discussion

Socio-Demographic Data

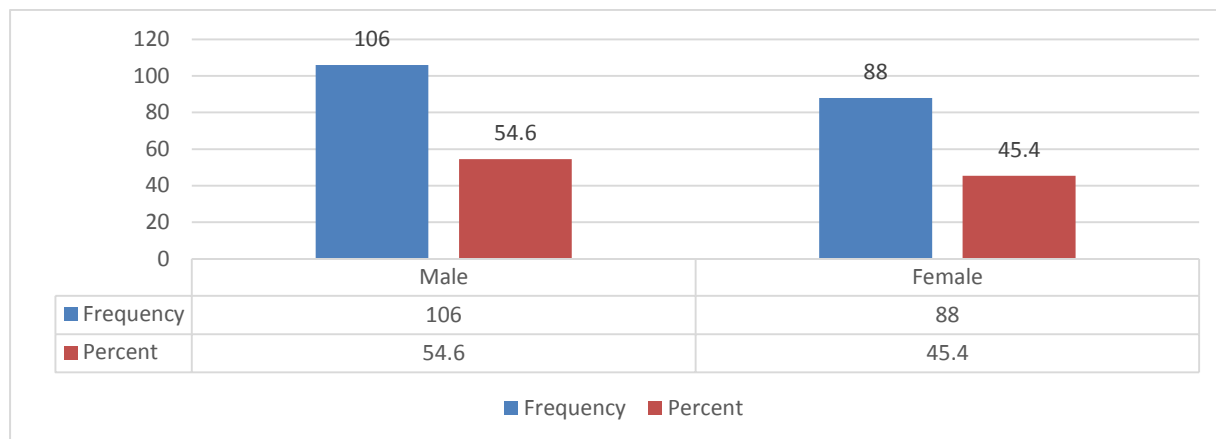


Figure 1: Respondents' Sex Distribution

Source: Fieldwork Survey (2023)

Figure 1 above shows that 106 respondents representing (54.6%) were males while 88 respondents (45.4%) were females. This indicates a higher ratio of males to females in the research.

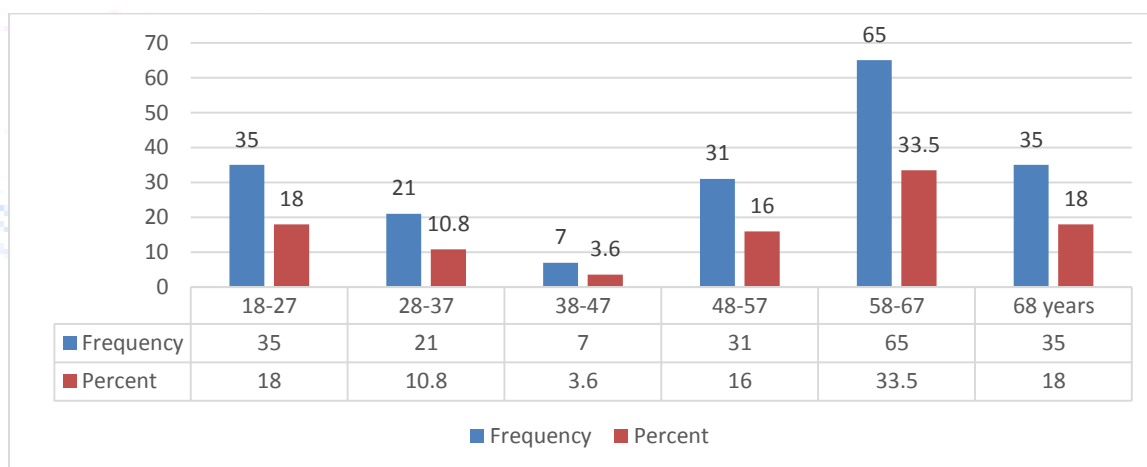


Figure 2: Respondents' Age Distribution

Source: Fieldwork Survey (2023)

In Figure 2 above, 35 respondents representing (18%) were within the age range of 18 and 27 years; 21 representing (10.8%) are between the age of 28 and 37; 7 representing (3.6%) were aged between 38 and 47; 31 representing (16%) were between 48 and 57; 65 representing (33.5%) were between 58 and 67 years while only 35 respondents representing (18%) were between the aged between 68 years and above.

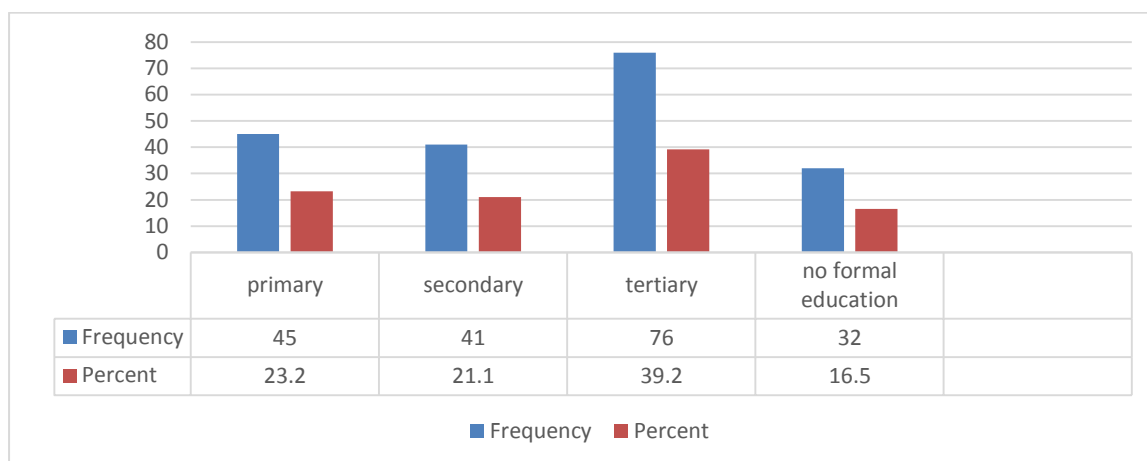


Figure 4: Educational Distribution

Source: Fieldwork Survey (2022)

Also on Figure 3, 45 representing (23.2%) of the respondents had primary education, 41 representing (21.1%) had secondary school education, 76 representing (39.2%) had tertiary education while 32 representing (16.5%) had no formal education experience.

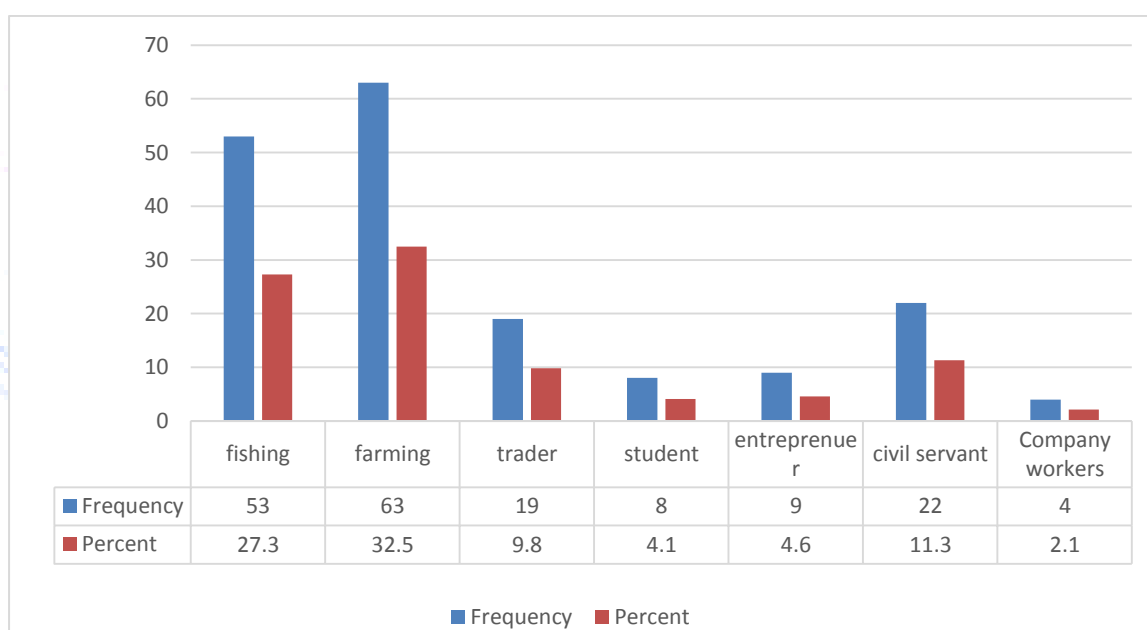


Figure 6: Occupational Distribution of the Respondents

Source: Field Survey (2022)

Again, the occupational status of the respondents indicated that 53 respondents representing (27.3%) were into fishing, 63 representing (32.3%) were farmers, 19 representing (9.8%) of the respondents were traders, 8 representing (4.1%) were students, 9 representing (4.6%) were entrepreneurs, 22 representing (11.3%) were civil servants while the remaining 4 respondents representing (2.1%) were company workers.

Research Question 1: What are the causes of oil spillage in rural communities in Bonny?

Table 1. Causes of oil spillage in rural communities in Bonny

| S/N | Items | SA | A | D | SD | Mean | STD | Decision Rule |
|-----|---|-----|-----|----|----|-------------|-------------|-----------------|
| 1 | Leaking or corroded pipelines in Bonny Island | 68 | 99 | 22 | 5 | 3.18 | 0.73 | Accepted |
| 2 | Poorly maintained storage tanks | 53 | 80 | 42 | 19 | 2.86 | 0.93 | Accepted |
| 3 | Improper disposal of used oil and other petroleum products | 58 | 121 | 13 | 2 | 3.21 | 0.60 | Accepted |
| 4 | Accidents due to human negligence or error | 52 | 67 | 42 | 33 | 2.71 | 1.04 | Accepted |
| 5 | Natural disasters such as floods | 59 | 130 | 4 | 1 | 3.27 | 0.52 | Accepted |
| 6 | Damage to equipment during transportation and handling of oil vessels | 112 | 60 | 18 | 4 | 3.44 | 0.74 | Accepted |
| 7 | Illegal dumping of oil and other petroleum products | 90 | 96 | 7 | 1 | 3.41 | 0.58 | Accepted |
| 8 | Leakage petrochemical plants in Bonny | 64 | 90 | 35 | 5 | 3.09 | 0.77 | Accepted |
| | Grand Total | | | | | 3.14 | 0.73 | Accepted |

Source: Fieldwork Survey (2023)

The research question one sought to examine the causes of oil spill in rural communities in Bonny Local Government Area. The analysis revealed that Leaking or corroded pipelines in Bonny Island (Mean = 3.18, Std. = 0.73), poorly maintained storage tanks (Mean = 2.86, Std. = 0.93), improper disposal of used oil and other petroleum products (Mean = 3.21, Std. = 0.60), and accidents due to human negligence or error (Mean = 2.71, Std. 0.60). the analysis also revealed that there are other underlying factors that causes oil spill in the study area and some of the factors are natural disasters such as floods (Mean = 3.27, Std. = 0.52), damage to equipment during transportation and handling of oil vessels (Mean = 3.44, Std. = 0.74), illegal dumping of oil and other petroleum products (Mean = 3.41, Std. = 0.58), and leakage petrochemical plants in Bonny (Mean = 3.09, Std. = 0.77) were some of the factors causing an oil spill in the study area.

Research Question 2: What is the impact of oil spillage on the acute health condition of the rural community dwellers in Bonny, LGA?

Table 2. Impact of Oil Spillage on the Acute Health condition of the rural community dweller in Bonny, LGA

| S/N | Items | SA | A | D | SD | Mean | STD | Decision Rule |
|-----|---|-----|-----|----|----|------|------|---------------|
| 9 | Inhaling the fumes from the oil spill causes respiratory problems such as difficulty in breathing, chest tightness, and cough | 84 | 95 | 11 | 4 | 3.33 | 0.67 | Accepted |
| 10 | Contact with the oil spill can cause skin irritation, redness, and rashes | 70 | 101 | 20 | 3 | 3.22 | 0.69 | Accepted |
| 11 | Oil particles can irritate the eyes and cause redness, burning, and watering | 112 | 67 | 12 | 3 | 3.48 | 0.68 | Accepted |
| 12 | Inhaling the fumes from the oil can cause nausea, vomiting, and | 112 | 73 | 7 | 2 | 3.52 | 0.62 | Accepted |

| | | | | | | | | |
|----|---|-----|-----|----|----|-------------|-------------|-----------------|
| | dizziness. | | | | | | | |
| 13 | Long-term exposure to the fumes from the oil can cause severe headaches | 115 | 73 | 4 | 2 | 3.55 | 0.59 | Accepted |
| 14 | The oil can damage the kidneys, liver, and other organs | 55 | 71 | 41 | 27 | 2.79 | 1.00 | Accepted |
| 15 | The toxins in the oil can disrupt the central nervous system and cause neurological issues such as memory loss, confusion, and difficulty concentrating | 15 | 168 | 8 | 3 | 3.00 | 0.42 | Accepted |
| 16 | Long-term exposure to an oil spill can lead to weakness in the body's ability to fight off infections and diseases | 159 | 25 | 7 | 3 | 3.75 | 0.59 | Accepted |
| | Grand Total | | | | | 3.33 | 0.65 | Accepted |

Source: Fieldwork Survey (2023)

The Table 2 above revealed the impact of the oil spill on the health of the residents in the rural communities in Bonny Local Government Area. Some of the effects on human health are that the inhaling the fumes from the oil spill causes respiratory problems such as difficulty in breathing, chest tightness, and cough (Mean = 3.33, Std. = 0.67), contact with the oil spill can cause skin irritation, redness, and rashes (Mean = 3.22, Std. = 0.69), oil particles can irritate the eyes and cause redness, burning, and watering (Mean = 3.48, Std. = 0.68), inhaling the fumes from the oil can cause nausea, vomiting, and dizziness (Mean = 3.52, Std. = 0.62) while long-term exposure to the fumes from the oil can cause severe headaches (Mean = 3.55, Std. = 0.59) also represent the effects of oil spill on health of the people in Bonny LGA. Furthermore, the analysis also revealed that the oil can damage the kidneys, liver, and other organs (Mean = 2.79, Std. = 1.00), the toxins in the oil can disrupt the central nervous system and cause neurological issues such as memory loss, confusion, and difficulty concentrating (Mean = 3.00, Std. = 0.42), while long-term exposure to an oil spill can lead to weakness in the body's ability to fight off infections and diseases with the mean ratio of 3.75 and corresponding standard deviation of 0.59 revealed that oil spill affects the health of people in Bonny LGA.

Research Question 3: What ways can be employed to remedy the acute health effects of a crude oil spill in a rural community?

Table 3. Ways to Remedy Acute Health Effects of Crude Oil Spill in Rural Communities in Bonny

| S/N | Items | SA | A | D | SD | Mean | STD | Decision Rule |
|-----|---|-----|----|---|----|-------------|-------------|---------------|
| 17 | Provide medical care to those affected by the spill, including skin and eye irritation, respiratory issues, and nausea | 94 | 96 | 2 | 2 | 3.45 | 0.57 | Accepted |
| 18 | Provide safe drinking water and food | 113 | 75 | 5 | 1 | 3.54 | 0.57 | Accepted |
| 19 | Provide protective gear and respirators to those working in the cleanup process, and to those living in the affected area | 114 | 75 | 4 | 1 | 3.55 | 0.56 | Accepted |

| | | | | | | | | |
|----|---|-----|-----|----|----|-------------|-------------|-----------------|
| 20 | Monitor air quality and groundwater for contamination | 159 | 25 | 7 | 3 | 3.75 | 0.56 | Accepted |
| 21 | Provide mental health services for those affected by the spill | 75 | 58 | 34 | 27 | 2.93 | 1.05 | Accepted |
| 22 | Educate the community on the potential health risks associated with crude oil spills. | 116 | 69 | 7 | 2 | 3.54 | 0.61 | Accepted |
| 23 | Implement a plan to contain and clean up the spilled oil. | 74 | 117 | 2 | 1 | 3.36 | 0.53 | Accepted |
| 24 | Monitor and restrict access to the affected areas | 63 | 128 | 2 | 1 | 3.30 | 0.51 | Accepted |
| 25 | Properly dispose of any debris or waste materials related to the spill | 115 | 54 | 11 | 14 | 3.39 | 0.88 | Accepted |
| | Grand Total | | | | | 3.42 | 0.64 | Accepted |

Source: Fieldwork Survey (2023)

Research objective three seeks to find out the remedies to oil spill challenges in rural communities in Bonny LGA. The analysis revealed that some of the approaches that can help to reduce the effect on the people are to provide medical care to those affected by the spill, including skin and eye irritation, respiratory issues, and nausea (Mean = 3.45, Std. = 0.57), provide safe drinking water and food (Mean = 3.54, Std. = 0.57), provide protective gear and respirators to those working in the cleanup process, and to those living in the affected area (Mean = 3.55, Std. = 0.56), monitor air quality and groundwater for contamination (Mean = 3.75, Std. = 0.56), and provide mental health services for those affected by the spill (Mean = 2.93, Std. = 1.05). The respondents also revealed that to educate the community on the potential health risks associated with crude oil spills (Mean = 3.54, Std. = 0.61), implementing a plan to contain and clean up the spilled oil (Mean = 3.36, Std. = 0.53), monitoring and restrict access to the affected areas (Mean = 3.30, Std. = 0.51) and properly dispose of any debris or waste materials related to the spill (Mean = 3.39, Std. = 0.88) were some of the measures to curtail the challenges of oil spill effects on human health in rural communities in Bonny LGA.

Discussion of Findings

(a) Causes of Oil Spill in Rural Communities in Bonny

The research objective seeks to examine the causes of the oil spills in rural communities in Bonny. The analysis revealed that there is a myriad of causes of the oil spills in the sampled communities. Most of the respondents, 86.1 percent agreed that leaking or corroded pipelines in the rural communities have contributed to the oil spills in the area while less than 15 percent (i.e. 13.9%) disagreed with the finding that leaking or corroded pipelines cause an oil spill. Also, out of 100 percent of the respondents, 68.5 percent agreed that poorly maintained storage tanks cause oil spill that affects human health. On the issue of improper disposal of used oil and other petroleum product and the prevalence of oil spills, the study revealed that 92.3 percent confirmed the finding while a few of the respondents, 7.7 percent disagreed. According to a report by the United Nations Environment Programme (UNEP), “the majority of oil spills in the Niger Delta occur due to illegal activities such as oil theft, sabotage and improper maintenance of infrastructure” (UNEP, 2011).

Again, out of the total 194 respondents in the study, 61.3 percent indicated that oil spills could happen due to accidents orchestrated by human negligence or error. On the other hand, 38.6 percent disagreed. Oil spills caused by tanker accidents have become an increasingly frequent problem in many countries around the world. These spills are often caused by a combination of human errors and natural disasters and can have enormous consequences for the environment, wildlife, and the economy. Human

negligence is one of the main causes of oil spills from tanker accidents. Also, the analysis revealed that 97.4 percent of the respondents agreed that oil spill had occurred because of flood events. Additionally, oil spills may be caused by natural disasters such as floods, storms, and hurricanes. For example, in October 2012, over 40,000 barrels of oil were spilled due to flooding in the Niger Delta (The Guardian, 2012).

Having good knowledge of the coastal communities, the majority of the respondents believe that damage to equipment used in the transportation and handling of vessels has contributed to the rate of oil spills in the sampled communities. out of 194 participants in the study, the analysis revealed that 88.6 percent of the respondents agreed that damage to vessels used in transporting oil crude has spilled oil into the rivers and affected the coastal waters of the people in the area. On the contrary, 11.4 percent of the respondents agreed that such an occurrence has not affected the area. Again, 95.9 percent of the respondents indicated that the oil companies in the study area have carried out indiscriminate activities of dumping waste that is inimical to the health of the people inhabiting the area. Also, 79.4 percent of the respondents agreed that some of the companies in Bonny have contaminated the environment through their activities while 29.6 percent revealed that there has not been leakage from the activities of the petrochemical companies in the area. Oil companies can cause improper disposal and pollution through a variety of means. Improper disposal of waste materials, such as oil and other hazardous substances, can lead to contamination of water and soil. Oil spills, either caused by accidents or through intentional release, are a major environmental hazard that can lead to long-term damage to ecosystems.

(b) Impact of Oil Spillage on the Acute Health condition of the Rural Community Dweller in Bonny, LGA

The study also assessed the impact of oil spillage on the acute health condition of the rural community dwellers in the Bonny Local Government Area. The findings revealed that the majority of the respondents, 88.2 percent believed that contact of the people with the oil spill causes skin irritation, redness, and rashes on the body. Oil spills can have harmful effects on human skin. The main risk is contact dermatitis, which is an inflammation of the skin caused by contact with certain irritants. In the case of an oil spill, the irritant is the oil itself (Sapkota et al., 2018). Contact dermatitis can manifest itself as redness, itching, and in some cases, blisters and swelling. If the oil is toxic, it can also cause more serious health complications, such as skin infections and rashes, as well as long-term health effects. In addition, oil spills can also contaminate water supplies and contaminate the food chain, leading to further health risks (Falk, 2018).

Furthermore, 92.2 percent of the respondents indicated that particles from the crude oil cause irritation to the eyes as well as cause burning and watering of the eyes. The analysis further indicated that a few of the respondents, 7.7 percent believed the contrary. This indicated that oil spills or particles from oil exploration activities are capable of affecting the eyes too. Out of the total respondents in the study, 95.3 percent believed that inhaling the fumes from the oil can cause nausea, vomiting, and dizziness. Nausea, vomiting, and dizziness are common symptoms of motion sickness (Betts, 2020). Motion sickness is a condition that occurs when the body is exposed to certain types of motion, such as being on a boat or in an airplane (Mayo Clinic, 2020). While the exact cause is not known, it is believed to be a result of an imbalance between the body's perception of movement and the actual movements (Betts, 2020). Treatment of motion sickness typically includes over-the-counter medications and avoidance of the stimuli that trigger the motion sickness (Mayo Clinic, 2020).

Further analysis also revealed that the oil spill is capable of damaging the human kidneys, liver, and other organs of the body. Out of 194 respondents, 65 percent of the respondents believed that the oil spill incidents in the rural communities have resulted in various medical conditions that have affected the well-being of the people in the sampled communities. Out of 194 respondents, 96.9 percent of the

respondents also indicated that long-term exposure of the people to the contaminated areas has resulted in severe headaches among the people affected. This further buttress the fact that the oil spill is detrimental to the health and well-being of the people in the affected sampled communities.

Most of the respondents, 94.3 percent agreed that the toxins in the oil are capable of disrupting the central nervous system and have resulted in myriads of neurological issues such as memory loss, confusion, and difficulty in breathing. On the other, 6.6 percent of the respondents disagreed that oil spills release toxins that affect health. Furthermore, 94.9 percent indicated that oil spill has affected people by causing weakness in the body's ability to fight off infections and diseases. The effect of oil spills on the ability of the body to fight infections has been the subject of multiple research studies in other climes. For example, one study found that oil spills may reduce the body's ability to fight infections by causing "alterations in the immune system" (Gonzalez-Munoz, et al., 2017). The study noted that these alterations, "in turn, can lead to an increased susceptibility to infectious diseases, causing a decrease in the body's ability to fight them" (Gonzalez-Munoz, et al., 2017). Consequently, it is important to limit exposure to oil spills and to take precautions to protect oneself from potential infections.

(c) The Ways that can be used to Remedy the Acute Health Effects of Crude Oil Spills in Rural Communities in Bonny

The study on the third objective assessed the ways that can be used to remedy the acute health effects of the crude oil spill in rural communities in Bonny. The study revealed that out of 194 respondents, 96.9% indicated that providing safe drinking water and food for rural people would help to mitigate the effects of oil spill pollution in the sampled communities. On the other hand, 3.1 percent disagreed that providing safe drinking water is a panacea to the problem. Again, the study analysis indicated that there is a need for the government and all stakeholders to provide protective gear and respirators to those working in the clean-up process, and to those living in the affected areas. For instance, 97.5 percent indicated that the above effort would help mitigate the challenge and reduce the effect on the people.

Furthermore, the study established that efforts towards providing medical services to victims of an oil spill would help to tackle the effects of oil spills on the inhabitants of the communities. For instance, 68.6 percent of the total respondents indicated that providing mental health services for those affected by the spill is a step in the right direction. On the other hand, 31.4 percent disagreed with the popular opinion, noting that oil spill does not affect the mental health of the people and mental health solutions will not provide succor. Most of the respondents, 94.9 percent confirmed the fact that providing monitors to check groundwater for contamination. Providing education to the residents of rural communities is another solution to the challenge of oil spills and the attendant consequences for the people. 95.4 percent of the respondents agreed that educating the community on the potential health risks associated with crude oil spills while 4.6 of the respondents objected to the idea.

The analysis also assesses the effort toward implementing a plan to contain and clean up the spilled oil and the implications of mitigating the effects of oil spills on the people in rural communities in Bonny and the analysis revealed that 98.4 percent indicated that by implementing a plan to contain and clean up the impacted sites would assist to reduce the impact on the people. On the other hand, 1.5 percent disagreed with the finding. Furthermore, 98.5 percent of the respondents were of the view that monitoring and restricting access to the affected areas would help cushion the situation while 1.5 percent disagreed. The Implication is that most of the respondents believed monitoring and deterring people from entering the impacted areas would help reduce the effects on the people. To this end, 87.1 percent agreed that properly disposing of any debris or waste materials related to the spill would mitigate the effects of the spills on the rural people in Bonny. On the other hand, less than 10 percent of the respondents (i.e. 12.9%) disagreed with the findings.

Conclusion

Oil spill pollution can have significant impacts on the health of rural communities. The inhalation of hazardous fumes caused by oil spills, as well as the contamination of drinking water and soil, led to a variety of acute health problems, such as respiratory issues, skin irritation, and gastrointestinal distress. In addition, long-term exposure to oil spill pollution contributed to the development of chronic health issues, such as cancer and neurological disorders. Therefore, it is imperative that the government and other organizations take steps to reduce the risk of oil spills and their potential health impacts in rural communities.

Recommendations

- i. Establish strict regulations and guidelines for companies who are responsible for oil spills, such as those that involve offshore drilling, that is designed to reduce the risk of oil spills and subsequent pollution. Also develop strategies to monitor and contain oil spills, such as using booms, skimmers, and dispersants, in order to reduce the amount of oil that reaches rural communities.
- ii. Invest in research to better understand the impacts of oil spills on human health and the environment, particularly in rural communities. Educate the public on the risks of oil spills in rural communities, and provide resources for those affected to seek medical help.
- iii. Increase funding for healthcare services in rural areas to ensure that those affected by oil spills have access to quality medical care. Implement programs to clean up and remediate areas affected by oil spills, and provide financial assistance to those affected. Develop long-term plans to reduce the risk of oil spills and their environmental and health impacts in rural communities.

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